



**National
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Assessment
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Kalush Chemical Combine, USSR

An Imagery Research Paper

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*Basic Imagery Interpretation Report
IS 78-10150, RCS-13/0011/78
August 1978*

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INSTALLATION OR ACTIVITY NAME					COUNTRY	
Kalush Chemical Combine					UR	
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NUMBER	COMIREX NO.	NIETB NO.	
NA	49-04-32N 024-18-12E					
MAP REFERENCE DMAAC. USATC, Series 200, Sheet FP0232-20 HL, 5th ed, Aug 76, Scale 1:200,000 (SECRET/Authorized for Release to NATO Forces/Warning--Sensitive Intelligence Sources and Methods Involved)						
LATEST IMAGERY USED				NEGATION DATE (If required)		
September 1977				NA		

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ABSTRACT

The Kalush Chemical Combine produces solvents, an intermediate chemical monomer for resins production, a possible polymer resin, and several unidentified intermediate or final chemical products. Specific identified products of the combine include chlorine, caustic soda, and the solvents carbon tetrachloride, perchloroethylene, and hydrochloric acid. Vinyl chloride monomer, which is possibly polymerized to polyvinyl chloride, is also produced. One facility in the combine might produce polyacrylamide and another might fabricate titanium metal.

The combine was under construction when it was first observed in 1963. By 1965, a possible chlorine and caustic soda plant had been completed and construction had started on an unidentified plant and on what could be a titanium fabrication plant. Construction on these plants was completed in 1970 and 1969 respectively. The combine has continued to expand since that time. During the 1971-75 Five-Year Plan, a chlorine and caustic soda plant, a vinyl chloride monomer plant, a possible polyvinyl chloride plant, and an unidentified plant were constructed. Construction also began on three other unidentified plants. Several production plants that were begun prior to 1971 were also completed during the five-year period. These include a solvents plant, a chlorine and caustic soda plant, and what could be a polyacrylamide plant. In late 1977, construction was continuing on the three unidentified plants and construction had begun on another unidentified plant.

This report includes a general discussion of the combine and a table listing its production areas. The table also provides the volumes of the major production buildings and the chronology of their construction. The table is keyed to a photograph of the combine.

The information and judgments presented in this publication were derived principally from analysis of imagery. Although information from other sources has been included, this publication does not reflect an all-source assessment and has not been formally coordinated within CIA.

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INTRODUCTION

The Kalush Chemical Combine is about 6 kilometers (km) northwest of Kalush and about 450 km southwest of Kiev in the Southwest Economic Region (Figure 1). The combine is served by rail and road and is partially secured by a wall. It receives steam and electric power from the Kalush Heat and Thermal Power Plant TETS located adjacent to the combine. Natural gas for carbon tetrachloride production is probably piped in from the Dolina gas fields and ethylene for vinyl chloride monomer production is reportedly piped in from the Tiszapalkonya Chemical Combine in Hungary. 1/ Salt for chlorine and caustic soda production probably comes from local deposits. The combine's processing areas occupy about 100 hectares; its associated storage, support, and shipping areas occupy about 140 hectares.

The Kalush Potassium and Metallurgical Combine, located 3 km south of the chemical combine, may receive polyacrylamide from the chemical combine for use as a mineral flocculant in ore segregation. It may also receive chlorine for titanium metal production. The metallurgical combine may send titanium metal to the chemical combine for fabrication. Press reports suggest that the Kazinebarcika Chemical Combine, Hungary, located about 300 km southwest, is scheduled to receive some of the vinyl chloride monomer from the combine for polyvinyl chloride production. 2/

DISCUSSION

Products

The Kalush Chemical Combine produces solvents, an intermediate monomer chemical for resins production, and a possible polymer resin. Collateral data reports the combine is also producing polyacrylamide (a thickening and suspending agent) and fabricating equipment using titanium metal. The combine could also be fabricating chemical processing columns. 3,4/ The chemicals which most likely are shipped from the combine include carbon tetrachloride, perchloroethylene, and -- if it is produced at the combine -- polyvinyl chloride. Chemicals partially consumed within the combine in the production of other products include chlorine, caustic soda, hydrochloric acid, and vinyl chloride monomer. The combine also produces several unidentified intermediate or finished chemicals.

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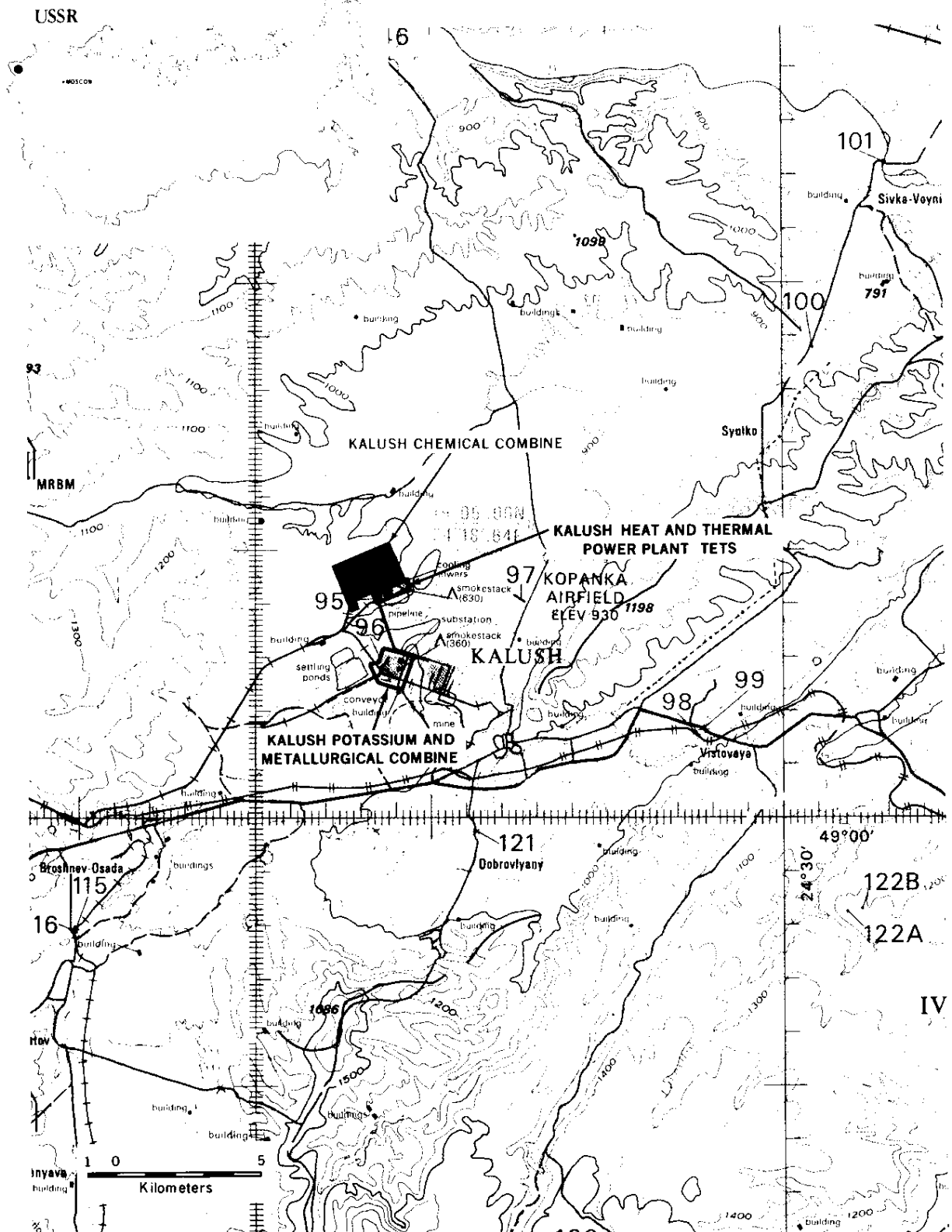


FIGURE 1. LOCATION MAP.

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Construction Chronology

The combine was under construction when first observed in mid-1963. By 1965, a possible chlorine and caustic soda plant had been completed. During this period, construction had started on an unidentified plant and on what could be a titanium metal fabrication plant.

Between 1965 and 1971, construction was completed on what may be the reported titanium fabrication plant and on the unidentified plant. Construction had begun on a solvents plant, a confirmed chlorine and caustic soda plant, and a reported polyacrylamide plant. 3/ The work on these three plants appeared complete by 1974.

During the 1971-75 Five-Year Plan, a second confirmed chlorine and caustic soda plant, a vinyl chloride monomer plant, a possible polyvinyl chloride plant, and a second unidentified plant were constructed and construction began on three additional unidentified plants. The reported titanium fabrication plant was also expanded during that period. In late 1977, construction on the three unidentified plants -- and on one begun in 1976 -- was continuing.

Since 1969, construction has been under way on a facility in the east corner of the combine. A number of buildings were partially constructed and then razed. By September 1977, new building basements and foundations had been prepared and 20 probable storage tank bases had been completed. It is not certain whether this construction is for a new chemical production plant or for additional support for existing plants in the combine. Until the function of this area can be determined, it will be considered part of the combine's support and storage areas.

Civil Defense Measures

One personnel shelter, a detached mounded bunker with three personnel entrances, was identified in the combine's administration area. Construction began between December 1973 and January 1975 and was completed by July 1977. No other measures expressly intended for civil defense purposes are evident on photography.

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Table 1. Production Areas at Kalush Chemical Combine
(Keyed to Figure 2)

Area	Function and Major Observable Components (Building Volumes in Cubic Meters)	Remarks
A	<u>Reported Titanium Metal Fabrication</u>	
	1 - Production building (207,170)	Under construction in 1963 and completed in 1969. The plant was slightly expanded between 1972 and 1976. Some of its facilities are probably devoted to the maintenance of the combine. Cylindrical tanks or columns were observed being stored adjacent to the shipping building in September 1977. The Soviets reported they could fabricate titanium processing columns at Kalush. 3/
	2 - Production building (55,750)	
	3 - Production building (32,650)	
	4 - Production building (25,160)	
	5 - Production building (a)* (5,340) (b) (19,980)	
	6 - Production building (8,690)	
B	<u>Unidentified</u>	
	1 - Production building (76,170)	Under construction in 1975 and still under construction in September 1977.
	2 - Production building (12,720)	
	3 - Production building (15,280)	
	4 - Production building (68,350)	
C	<u>Unidentified</u>	
	1 - Production building (68,010)	Under construction in 1975 and nearing completion in September 1977. The largest production building resembled an electrolytic cell building found in a chlorine plant; however, the area appeared to lack the other necessary facilities for chlorine production.
	2 - Production building (10,010)	
D	<u>Unidentified</u>	
	1 - Production building (51,720)	Under construction in 1972 and completed in 1975. The larger production building
	2 - Production building (7,730)	

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Table 1. (continued)

Area	Function and Major Observable Components (Building Volumes in Cubic Meters)	Remarks
		resembles an electrolytic cell building in a chlorine plant; however, the area appears to lack the other facilities necessary for chlorine production.
E	<u>Vinyl Chloride Monomer Production</u>	
	1 - Production building (50,260)	Under construction in 1973 and completed in 1975. The plant uses the Hoechst-B.F. Goodrich (US) oxychlorination process and was built by Friedrich Uhde (West Germany). The feedstocks for the plant are chlorine from the combine and ethylene piped about 350 km from the Tiszapalkonya Chemical Combine in Hungary. The design capacity is 250,000 metric tons per year (mt/yr). <u>5/</u>
	2 - Pumps and control building** (29,620)	
F	<u>Reported Polyacrylamide Production</u>	
	1 - Production building (13,950)	Under construction in 1968 and completed in 1972. Some of the polyacrylamide could be sent to the Kalush Potassium and Metallurgical Combine for use as a mineral flocculant in ore segregation.
	2 - Production building* (5,610)	
	3 - Production building (8,400)	
	4 - Production building (19,850)	
	5 - Production building (12,660)	
G	<u>Possible Polyvinyl Chloride Production</u>	
	1 - Production building (33,180)	Under construction in 1972 and completed in 1975. The plant reportedly has three production lines supplied by East Germany, and each has a capacity of 60,000 mt/yr. The first line reportedly began production in 1975. <u>6,7/</u>
	2 - Reactor and drying building** (341,210)	
	3 - Production building (7,910)	
	4 - Production building (27,770)	

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Table 1. (continued)

Area	Function and Major Observable Components (Building Volumes in Cubic Meters)	Remarks
H	<u>Unidentified</u>	
	1 - Production building (27,850) 2 - Production building (60,530) 3 - Production building (9,820) 4 - Production building (11,890) 5 - Production building (4,610) 6 - Production building (9,050) 7 - Production building (5,030) 8 - Production building (21,260) 9 - Production building (3,830) 10 - Production building (21,910) 11 - Production building (6,220)	Under construction in 1964 and completed in 1970. Two buildings in the plant have been razed and are being replaced.
I	<u>Solvents Production</u>	
	1 - Production building (7,480) 2 - Production building (24,440) 3 - Production building (a)* (670) (b) (3,800) 4 - Production building* (2,880)	Under construction in 1970 and completed in 1973. The plant uses process technology from Stauffer (US) and was engineered by Speichim (France). It produces 33,000 mt/yr of carbon tetrachloride, 29,700 mt/yr of perchloroethylene, and 39,600 mt/yr of hydrochloric acid. Operation was reportedly delayed until 1974 because of poor Soviet construction work and frequent shortages of feedstock. <u>3,8/</u>
J	<u>Possible Chlorine and Caustic Soda Production</u>	
	1 - Production building (41,040) 2 - Production building (a)* (3,490) (b) (3,850) 3 - Production building (a)* (280) (b) (4,070) 4 - Possible electrolytic cell building** (48,860) 5 - Production building (14,590) 6 - Production building (10,890) 7 - Production building (18,390)	Under construction in 1963 and completed in 1965. This was the first plant in the combine to become operational.

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Table 1. (continued)

Area	Function and Major Observable Components (Building Volumes in Cubic Meters)	Remarks
K	<u>Chlorine and Caustic Soda Production</u>	
	1 - Possible electrolytic cell building (58,340)	Under construction in 1969 and completed in 1973. The presence of caustic evaporators suggests the plant is using diaphragm cells for electrolysis.
	2 - Production and shipping building (68,890)	
	3 - Electrolytic cell building and caustic soda concentrator building** (229,610)	
	4 - Pump building (20,190)	
L	<u>Unidentified</u>	
	1 - Production building (51,530)	Under construction in 1975 and still under construction in September 1977.
	2 - Production building (17,580)	
	3 - Production building (56,170)	
	4 - Production building (48,940)	
	5 - Production building* (5,020)	
	6 - Production building* (18,820)	
M	<u>Chlorine and Caustic Soda Production</u>	
	1 - Production building (10,570)	Under construction in 1972 and completed in 1973. The brine feedstock probably comes from the brine preparation area.
	2 - Caustic soda production building (37,490)	
	3 - Electrolytic cell building** (109,450)	
N	<u>Unidentified</u>	
	1 - Production building (13,960)	Under construction in 1976 and still under construction in September 1977.
	2 - Production building (71,180)	

*Single-story building or building section; all others are multistory.

**Critical component whose damage or destruction would render the combine,
or at least related production areas, inoperable for the longest time.

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REFERENCES

Imagery

Selected photography of the Kalush Chemical Combine from August 1963 through September 1977 was used in the preparation of this study.

Documents

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Requirement

COMIREX NO7
Support Number 480814 EN

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The author of this report is [] Economic Resources
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